**Micro Case 48 – *Bordetella pertussis* (pertussis)**

**1. Signs and symptoms for the disease it produces.**

● Paroxysmal cough

● Whoop

● Post-tussive vomiting

● Conjunctival hemorrhages/facial petechiae

● This pt had not been vaccinated

**2. The source of infectious organism.**

*Bordetella pertussis*

**3. The manner of exposure, route of infection, tissues that they reside and, where appropriate, transmission to others.**

* Transmission via respiratory droplets

**4. The pathology and the manner by which the particular disease develops and/or is induced, including damage caused by the pathogen and damage caused by the immune system’s response to the pathogen.**

* Inhaled bacteria attach to respiratory cilia
* Attachment mediated by filamentous hemagglutinin
* Produces toxins that paralyze cilia
  + Pertussis toxin irreversibly inactivates the Gi protein complex via ADP ribosylation
  + Leads to prolonged stimulation of adenyl cyclase ---> increase in cAMP
  + Tracheal cytotoxin kills ciliated cells
  + Hemolysin kills mucosal epithelial cells
* Exudate is formed in the respiratory tract, compromising the airway and predisposing the individual to paroxysmal coughs

**5. Methods of identification and placement into a particular biological subset.**

* Epidemiologic and clinical criteria of paroxysmal cough for 2-3 weeks can be used to make diagnosis because presentation and duration of symptoms are so typical
* For young infants and atypical cases
  + Direct fluorescence antibody (DFA) of nasopharyngeal specimen
  + Culture of posterior nasopharyngeal secretions
  + PCR of nasopharyngeal swab or aspirate

*B pertussis* are small, nonmotile, aerobic Gram negative rods. They are nutritionally fastidious bacteria, requiring special growth medium for isolation. Antigenic products include pertussis toxin, filamentous hemaglutinin, agglutinogens, adenyl cyclase, and tracheal cytotoxin.

**6. Factors leading to enhanced resistance or susceptibility (e.g., recipients of vaccines, residence in geographic areas, types of work, immunodeficiency, alcoholism, age, violence/abuse, religious beliefs, etc.).**

* Lack of vaccination (DTaP)
* Pts with underlying cardiac, pulmonary, neuromuscular, or neurologic diseases are at a high risk for complications

**7. Other organisms in the differential diagnosis and how to discriminate among potential causative agents.**

● Adenoviruses

● Bacterial causes of bronchitis

● Non type b *Haemophilus influenza*

● *Mycoplasma pneumonia*

● *Chlamydophila pneumonia*

● *Bordetella parapertussis*

● Parainfluenza viruses

● Respiratory syncytial virus (RSV)

All of the above can cause tracheobronchitis, but the classic presentation of paroxysmal cough and whooping and the prolonged duration of symptoms makes *Bordetella* the most likely agent.

**8. Prevention, treatment and vaccine design (live vs. dead).**

**Acellular pertussis vaccine** in combination with diphtheria and tetanus toxoids (DTaP) should be administered to all children aged 6 weeks to 6 years.